





Mr. Butcher on Excision of the Upper Jaw and Malar Bone.

# REPORTS

IN

## OPERATIVE SURGERY.

Series the Sixth.

BY

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# REPORTS IN OPERATIVE SURGERY.

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1. SUCCESSFUL EXCISION OF THE ENTIRE UPPER JAW AND MALAR BONE, FOR AN ENORMOUS TUMOUR INVOLVING BOTH, AND FILLING THE PAROTID REGION.
2. SUCCESSFUL EXTRIPATION OF THE EYE, FOR TRUE SCIRRHUS OF THE EYEBALL.
3. SUCCESSFUL EXCISION OF THE ELBOW JOINT; NEARLY FIVE INCHES OF BONE CUT OUT; RECOVERY, WITH PERFECT USE OF THE LIMB.
4. SUCCESSFUL EXCISION OF THE ENTIRE RADIUS FROM ONE ARTICULAR SURFACE TO THE OTHER, WITH NEARLY ALL THE FUNCTIONS AND POWERS OF THE LIMB PRESERVED.

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SEVERAL cases force themselves upon me for precedence in the present number of these "Reports;" and yet, though having a very short time ago written a memoir in reference to excision of the upper jaw, and again, more recently, dwelt upon various additional modes of removing the bone and portions of it, I again, nevertheless, select the subject for a first place, because it enables me to pay a passing tribute of homage and praise to the great surgeon who originated this bold project, and who has been recently taken from amongst us, happily according to the course of time; not ruthlessly torn away, but gently removed in old age, while yet in full and vigorous possession of his faculties and mental acumen, covered with

distinction and honour. The finger of science, throughout time, must ever point to the name of Lizars, as conspicuous amongst the pre-eminent of the Scottish school.

**CASE I.—***Successful extirpation of the entire upper jaw and malar bone, for an enormous tumour springing from the former, extensively implicating both, and filling up the parotid region. Mode of securing the patient. Advantages of the free application of the actual cautery. Mode of dealing with salivary fistula.*

Thomas D., aged 45 years, admitted to Mercer's Hospital March 9th, 1860. At this date he was recommended to me by a very able surgeon in the country, as a suitable case for operation. The man's appearance certainly presented very frightful deformity, owing to an enormous tumour, involving the left superior maxillary and malar bones, and filling up the parotid region, on the same side, implicating, far and wide, the important parts traversing the space. The suggested operative procedure of total removal was truly a formidable undertaking, a bold and terrible measure; but, as presently will be seen, practicable as suggested by my learned friend, and happily carried into effect. I shall first briefly detail the history of the case, its commencement and progress—the special operation, its intricate and complicated steps—the pathological states and conditions of the morbid product—and, finally, make a few practical observations, bearing upon the facts. Nearly two years before his admission, he was first apprised of the commencement of those changes which so quickly followed in succession—a dull, heavy pain, fixed in the upper jaw, under the floor of the orbit, and to the outer side of the canine depression; this soon changed its wearying character for one of a more acute and violent nature, coming on at quick and repeated intervals, and usually located in the site of the two last molar teeth. No arguments could prevent the man having the teeth drawn. They were removed, but with no mitigation, or even temporary rest, from suffering. "For six long and weary months," as he expressed himself, did this deep and boring pain fix itself within the bone—often preventing sleep altogether, frequently impairing it for nights in succession. Yet all this time there was no swelling, no enlargement. However, quickly after this, in the seventh month, changes were being brought about, alterations manifest, and, in quick succession, they supervened upon each other; the hollow beneath

the orbit began to disappear; quickly its depressed surface became on a level with the edge of the orbit and the alveolar range; soon again the bone was forced out, as prominently as the malar; and now the sufferings began to assume even a more aggravated type; pain diffused over a more extensive surface; located in organs—the eye, the ear; developed in contiguous surfaces, the nose, the palate, the throat. Thus the case gradually progressed, up to the time of his coming under my observation. His condition altogether was so remarkable, that I shall endeavour to map out all interesting particulars with as faithful and accurate a hand as so serious an investigation merits, nay, even demands. For several months after this time the pain became comparatively trifling, as contrasted with what it had been in the early development of the tumor, even though its magnitude was steadily progressive. Suddenly, however, as the tumor encroached upon the parotid space, his sufferings were again augmented. The appearance of the man, previous to operation, is accurately depicted in plate I. figure 1, from a truthful picture drawn by Connolly, and beautifully lithographed by Forster. It will be seen that the whole countenance was hideously distorted. The tumour now was fully as large as the two clenched fists; springing from within the antrum, it forced out its walls in every direction, impinging on every neighbouring cavity. Its outward direction being most palpable at first, but soon passing mesially, it forced in the nasal partition, thrusting gradually aside the turbinated bones; blocking up altogether the left nostril from the anterior to the posterior opening, and slightly bulging the septum nasi to the opposite side; it did not protrude in front, and only to half an inch behind, being in both these aspects firm and dense to the touch, not yielding blood, even on forcible pressure. By its volume, too, the palate-plate was thrust down upon the tongue three-quarters of an inch below its normal position, and here also the same solid characters marked the growth. There was nothing peculiar in the colour of the part, save that it was of a darker hue, and probably a little more vascular than the same region on the healthy side. This deeply depressed state of the palate did not compensate sufficiently for the rapidity of the growth and the expansive force exerted by its progress; for the orbital plate of the maxilla was bulged upwards, partly dislocating the eye from its normal bed, altogether from its proper axis, at the same time evertting the organ, and making so tense the optic nerve, that the vision of the eye was exceedingly imper-

fect. On examining with the finger, this change in the bony plate could be felt. We next come to consider the tumour in its anterior and external aspects, involving, as it did, the whole side of the face, from the nasal process to the ear, and particularly from the junction of the malar and frontal bones to the angle of the jaw. The measurements here passed over an enormous projecting mass, so that the integuments were borrowed from neighbouring parts—the nose dragged from right to left, and the mouth in the same direction; the lips slightly apart, and the jaw depressed; being kept so by unnatural encroachment of the growth within acting as a mechanical obstacle, and to a somewhat greater extent in acquiescence to the will of the patient, to admit a free supply of air, in compensation for the obstructed nostrils. Following the tumour outwards, it was found to have incorporated with it the malar bone, throughout its entire extent; and, on opening the mouth, the tumour was found to pass backwards and outwards, blocking up the entire pterygo-maxillary fossa, and projecting beneath and behind the angle of the jaw; while a more superficial part passed externally to the jaw, matting in its surface the structure of the masseter muscle, and becoming imbedded in the parotid. The deep and intricate relations of the growth in this region were alarming. Yet, withal, there was one hopeful feature even in this direction—the same solid character stamped the tumour; in other words, it could, by careful manipulation, be definitely followed by insinuating cautiously the tips of the fingers; at least *thus* I was satisfied in my own mind. The entire expression of the man was marked with grief, and very pitiable. The integument covering the tumour presented throughout nearly a natural appearance; over the most prominent parts of the growth, however, it was of a dusky-red colour, evidently from congestion, owing to pressure from behind retarding its circulation, and probably acting on a larger supply of blood than had been destined for its supply; it was likewise thinned and shining, yet movable upon the tumour; not identified or incorporated with it at any point. The patient permitted the tumour to be handled with impunity; and no pain was elicited during the manipulation, or lurked in it after. To the touch, it was braced, firm, and unyielding throughout; perfectly immovable from base to apex; and, in all its characters, affording a fine example of osteo-sarcoma.

The man, though afflicted with this formidable tumour, seemed otherwise in good health; and as he pressed strongly that it might be removed, I saw no valid reason against com-

plying with his request. On the 14th of March, 1860, I operated after the following manner. Before, however, entering upon the several steps of this difficult measure, I shall digress for a few moments, to dwell upon the way in which the patient was secured--precautionary measures of the kind not being sufficiently attended to. The man being seated in a strong, heavy arm-chair, made of oak, his feet were raised a few inches from the ground, and lashed to the corresponding legs of the chair, while his arms were secured to it laterally and behind. To prevent any upward movement, a strong slip of wood, about four inches wide, was passed under the arms of the chair, and across the thighs. I would wish to insist very strongly on these directions; because, speaking practically, I have seen before now, the patient, when not properly secured, break away from all restraint made by hands, and only by force dragged back to the position which he should never have been permitted to quit. It seems a cruel act to lookers-on, the preparatory measure of tying the patient; but it is a practice that never should be dispensed with. No surgeon can estimate beforehand the power which his patient may possess of enduring pain; and no patient can be so satisfactorily cognizant of the fortitude he may command, as to resist a goading agony, that, in its intensity, he never could by possibility have even imagined; and, when felt, the all-powerful impulse to burst away and escape is that alone which takes possession of the sufferer. But even the remote likelihood of such a casualty, granted the term to those sceptical, should never be risked: the patient should be so protected as to be incapable of injuring himself. This precautionary security I hold to be the duty of the surgeon to enforce--nay more, it is an extension of leniency to the individual that is to suffer; for by its adoption, rapidity of procedure is facilitated, if intricate dissections are to be executed, the patient's safety is insured; all suffering is abridged; and, when chloroform is inadmissible, the shock of operation is lessened in its duration. A few words as to the support for the head of the patient. I greatly prefer it resting upon the breast of an assistant, to being sustained against a high-backed chair; because facilitating movements in various directions, and for several purposes, viz., the more ready application of instruments, often made to act more effectively by ever so trifling a change in the position of parts; the facility afforded where cautious and minute procedure is called for, the patient not being able to dip down and droop the head; and, finally, as being more under command to clear out coagula, to

facilitate the application of cauteries, the ligaturing of vessels, and the arrest of hemorrhage. It may appear superfluous to enter into these minute particulars. To those accustomed to deal with such severe measures as I am about to detail, they will indorse these precautionary measures with their sanction. As to the man who reads these pages, wrapped in self-sufficiency and egotism, I have nothing to say. But I would speak faithfully, so as to guide the young surgeon; and I think I would be culpable if I did not append these cautions, because, if followed out, acted up to, they will, as I conceive, be powerful accessories towards establishing a confidence and a self-reliance in the operator; and materially tend towards securing a favourable issue, when everything otherwise would seem hopelessly beyond the pale of operative surgery.

The patient thus placed, with a strong light upon his face, I passed a sheathed bistoury into the mouth, its blade being directed from the left commissure towards the malar bone, and its point steadily fixed against the cheek, as high as the connexion between it and the tumour would permit of. The sheath was then withdrawn, transfixion accomplished, and the mouth laid open from within, outwards, along the track of the instrument. A quick dash of blood might have been expected from the facial artery to follow this stroke of the instrument; but the precautionary step of compressing the vessel while bending round the bone was effectively executed in preventing such a loss, until its cardiac end was ligatured. This incision did not at all reach high enough, so the bistoury was laid aside, and the incision prolonged with a scalpel, over the tumour, up to the junction of the frontal and malar bones. The knife was then carried backwards and outwards along the zygomatic arch as far as its tubercle, or junction of the two roots. The flaps thus marked out were adherent and deeply implicated with the prominent development beneath. I next proceeded to dissect up the superior flap from the tumour, commencing in front, and detaching with it the left ala of the nose from its bony connexions. With cautious sweeps of the knife, the parts exterior to this likewise were freed, the blade of the instrument being kept close to the bone; and, while it passed outwards, the infra-orbital nerve was cut, where it emerged upon the cheek; and thus, too, the vessels passing through the same canal. As the knife travelled outwards, great caution was requisite to dissect the flap off the tumour, without breaking its integrity, the integuments were so strained and thinned from the inordinate pressure exerted by the morbid growth proceeding from within. How-

ever, this being satisfactorily accomplished, due care was necessary in lifting the entire flap by cautious touches of the knife, still upwards, so as clearly to reveal the lower segment of the osseous margin of the orbit, and even still further the forced-up plate, constituting the floor of that cavity. This dissection was delicate and complicated, because threatening the distorted organ of vision. The lower flap was next attacked, commencing at the angle corresponding to the outer wall of the orbit, and dissected downwards and backwards. The separation of this covering from the tumour was difficult in front, for the same reason as assigned when dealing with the upper flap; and as the dissection was carried back, the whole parotid region was exposed, being filled up by the excessive growth. The lower flap had to be set free, thrown down considerably below the angle of the jaw, before its superficial outline could be revealed in its entire extent. The man now got copious draughts of wine; for though no blood was lost, yet the shock manifestly produced a very decided effect, though these proceedings were executed with all the rapidity with which the knife could be made safely to travel.

Now that the entire mass of disease was fairly exposed, it was most pleasing to dwell upon the accuracy of the diagnosis, as to the amount of osseous parts implicated, and which must be taken away. It had been surmised, but was now revealed by demonstration, that the entire left maxillary bone, together with the malar, with their several and wide-spread processes, were all hopelessly seized upon, made parcel of, and distorted in its increase.

When the flaps were drawn apart, the superior thrown upon the forehead, the inferior hanging pendulous over the left side of the neck, with the projecting massive tumour between, an appearance was presented sufficiently alarming to cause several of the students to grow sick and faint.

The next step in the operation was the division of the hard parts. By doing so at this stage of the dissection, I was confident I could more easily get at the external and parotid Dean encroachments of the tumour. To accomplish this end, I drew the incisor tooth on the left side, and then passed one blade of a long narrow bone forceps into the corresponding nostril back into the pharynx, the other into the mouth. In a second the section was completed. The nasal process of the maxilla was next clipped across at its junction with the frontal bone. The forceps was next applied to the orbital margin, at the junction of the malar and frontal bones on the outside,

and the division made into the spheno-maxillary fissure. The zygomatic process of the temporal bone was then cut across, just in front of its tubercle; the forceps was then laid aside. Spreading the end of a towel upon the tumour, so as to prevent the hand slipping, I seized the maxilla, together with the growth, getting my thumbs well in upon the dense orbital margin, and broke down the entire from its posterior attachments. The detachment of the nasal, orbital, and palate plates, was all that could be desired; and then, by a few semi-circular wrenches, and breaking down of parts, by the index finger passed far back, all connexions were safely set free, even into the pharynx; and the wrenching of the parts lacerated the vessels so, that no bleeding worth making mention of followed the proceeding. This was all very well, as regarded the anterior and mesial attachments of the tumour; but its most dangerous relations were deep in the parotid space. All the superficies of the growth, as has been already mentioned, was fully exposed; but it required a long, painstaking, and careful dissection, to set it free from the important parts lodged in this region. Behind, the growth covered the external carotid, which was pressed somewhat backwards, and deeper than its normal course, while to its internal side lay the carotid for the brain, in its upward course; in connexion with their primitive trunks passed their corresponding veins, while, surrounding it on all sides, were vessels of magnitude, and nerves essential to life. The division of the several fixed or bony points rendered the tumour somewhat movable, and the crushing of its holdings behind, as before mentioned, increased this mobility,—circumstances of the greatest moment, as facilitating the tedious and dangerous dissection throughout this difficult proceeding. The knife's edge was kept well to the tumour; and wherever it was hard, or firm and smooth, the handle of the scalpel—the end of the index finger better than all—pressed away slightly adherent parts from it. Thus, by cautious manœuvres, by occasional touches of the knife, by breaking down adhesions, by twisting and wrenching with a guarded force the growth from its bed, the entire was brought safely away. But little blood flowed during the outer and posterior dissection; a couple of large vessels had to be ligatured, but not one on the inside. On carefully examining the extensive chasm, not a particle of the tumour could be detected as being left behind; and a similar inference was arrived at from an examination of the specimen removed. I next cauterized with the hot iron the entire raw surface within. And

now I would wish to say a few words in reference to the use of the cautery. My impression is, that it is not used as much as it should be in operations about the mouth. In all instances, whether there be hemorrhage or not, whether the growth be suspicious as to its characters of malignancy or not, I invariably use it, and that freely. If there be hemorrhage, its application arrests the flow; if parts are suspiciously malignant, it destroys contaminating radicals,—tendency to recurrence; if no bleeding, or malignancy, its touch quickly arouses an inflammatory action, healthy in its character, vital in repair. I have no doubt, by this rapid, healthy change, destructive, diffuse, erysipelatous forms of inflammation are guarded against. During the latter stages of the operation, the patient was supplied with brandy, and demanded it with a liberal hand.

All oozing of blood from the parts having ceased, the flaps were adjusted, and held together by several points of the interrupted and twisted suture. The former answered very well where the integuments were thinned, and at the angle above and throughout the horizontal wound; while the latter was most serviceable and efficient at the angle of the mouth, and again about three-quarters of an inch above this point, where the thickness of the parts was not altered or changed. The sutures were sufficiently numerous to hold every portion of the flaps in juxtaposition, sticking-plaster not being at all applicable, owing to the flaccidity of the detached parts. After the tumour was removed, the eye receded from its forced position, and drooped; and, I need scarcely remark, the lids remained open, from the temporary injury inflicted on their nervous supply. The organ was, however, supported in its natural position, in its proper axis, by compresses of lint passed into the chasm beneath, each having a silk cord attached, brought out of the mouth, and secured upon the forehead. By this mode, too, the cheek was prevented from falling back as much as it otherwise would have done. The patient being now sufficiently restored from shock, he was removed, in the horizontal position, from the operating theatre to his bed. The bed was made comfortable for his reception, being heated by jars filled with boiling water; the increased temperature was most grateful to his cold feet and chilled surface. He lay upon the affected side, with the head slightly raised, which position allowed the increased saliva—the weeping of fluids from the cut surfaces—to flow readily from the mouth, without irritating the parts concerned in respiration or deglutition.

The exterior characters of the tumour having been de-

scribed, I shall say a few words as to its internal arrangements upon section.

The results of the morbid inflammatory action were everywhere evident upon the walls and within the maxilla—thickening, condensation of new osseous matter, in all its several changes, from earliest deposition to the completion of perfect bone, thickening of periosteum, enlarged blood-vessels. In other points, bony structure—even of original formation—thinned, and flexible, and elastic, protruded by sarcomatous depositions from behind, characterized the growth; in some places, masses of broken down gelatiniform matter abounded; while in other localities, the deposit was cartilaginous, springy, and tough, like india rubber. In a few positions, the cancelli of the bone, particularly in the body of the malar, were as it were distended, forming numerous chambers, filled with morbid matter; while, pervading its external parts, numerous osseous spherules were developed, some adherent and protruding out from the solid bone wall; while in other localities, detached pieces could be found in cartilaginous beds. Softened patches might likewise be observed, giving much the resemblance of encephaloid cancer; yet, on being subjected to microscopic examination, no such degeneration could be verified as yet to have taken place. I not only examined the growth carefully myself, under the microscope, with regard to the all-important question of malignancy, but I submitted several portions of it to Dr. Mason, the able lecturer on Physiology. His report confirmed the conclusions I arrived at, namely, its non-malignant nature.

In two hours after the patient was put to bed, there came on some slight weeping of blood; but it ceased shortly, of its own accord, being so trifling as not to call for interference. It was, as I have elsewhere mentioned, occasioned by *the first injection of divided vessels by the exalted circulation of reaction*. In six hours after the operation, the cheek was warm, heat well generated over the body, and the man sleeping quietly.

On the following morning, 15th, the report was very favourable: he had a quiet night, slept, took freely of cold chicken-broth, and some wine. The cheek remains well sustained; the eye steadily supported in position, though the lids are still wide apart, motionless, and the conjunctiva a shade vascular; at the same time, the eye dull, its brilliancy lessened.

16th.—Had an excellent night, very little suffering; partakes freely of milk, eggs, beef-tea, and wine.

17th.—Slept quietly, and has partially regained the power

of closing the lids; some swelling over the parotid region; support as before, and a succession of warm stupe-cloths to the inflamed part.

On the 19th I removed the superficial plugs, leaving in the two immediately beneath the eye. Stupes beneficial in depressing the swelling, noted on yesterday; to be continued.

20th.—Removed the needles, and some of the stitches; union of the cheek perfect throughout, particularly in the thicker parts. Suffered the threads to remain where the covering of the tumour was thinned, as the bond of union, though accurate, was yet weak. Nutriment and support in abundance.

On the 22nd, cut out the remaining stitches; union perfect from one end to the other of the incisions. Removed also the remaining plugs; they came away with facility, being coated with purulent matter; and they fulfilled their office well, as the eye retained its natural position, being evidently held up by recent attachments, brought about, completed while the organ was steadied by this artificial support. At this time, too, full control was obtained over the lids; and the voluntary movements were effective in restoring brilliancy and tone to the cornea and its covering.

On the 7th April, I opened a small abscess in the parotid region, or rather in front, over the masseter muscle. From this flowed out pus and saliva in abundance, the latter fluid continuing for some days to drain freely from it. I passed an armed probe with a few threads of silk from the external opening, through the abscess, forwards into the mouth, and tied the seton up; and in a few days, having established a channel for the saliva into the mouth, I pared the edges of the external wound, brought them together, maintained them so by two points of twisted suture, using very fine needles, and in three days the wound was healed and closed permanently, and the saliva continued to pass by the artificial canal into the mouth.

On the 10th, the man was up, and walking about the ward. The cheek healed accurately throughout, somewhat flattened, being slightly corrugated about its centre; but the eye remained admirably supported, and following its fellow in all its motions; and the lids retained their place, and performed their functions as if the parts had never been meddled with. (See Plate I., Fig. 2.) On looking within, the surfaces are all covered with healthy granulations, and almost finally repaired. The functions of deglutition are well performed, and every day he is obtaining the power more and more of eating solids, and swallowing the bolus without hesitation; while fluids pass

backwards without the slightest regurgitation through the nostrils. His speech, too, is becoming again distinct, and he finds no difficulty in expressing his wishes.

A few days later and the man was up, and walking about the ward; and at the end of six weeks from the date of operation, he was sent home to the country perfectly cured.

I shall not leave this subject without directing the reader's attention, which I do with great pleasure, to an able paper on "Removal of the Upper Jaw," by Dr. Z. Johnson, Surgeon to the Kilkenny County Infirmary, and published in this Journal<sup>a</sup>, in which he gives the full details of a most interesting case operated upon by himself; and I must say the whole proceeding redounds greatly to his credit, judgment, and skill.

There are several interesting points in the case which I have detailed, for the practical surgeon to contemplate and dwell upon. It teaches the absolute necessity for accurate diagnosis, so that tumours be not meddled with, implicating the base of the skull, and perhaps incorporated with the very membranes of the brain, as I have seen them. It teaches how the surgeon must adapt the line of his cutaneous incisions according to the direction of the bulk of the tumour. It gives a confidence, how that the eye, though distorted, thrust out, and interfered with in its functions, may again be restored, maintained in position, and bring back enjoyment by its recovered powers. Finally, by the successful result, confidence is gained, and operative surgery maintains its exalted position.

**CASE II.—*True scirrhus of the Eye-ball, occurring as a primary affection, successfully extirpated; with special observations, particularly in reference to the operation.***

True scirrhus of the eye-ball is so exceedingly rare, as a primary affection, that I am gratified at having an opportunity of inserting this very remarkable case in these Reports in Operative Surgery. So seldom has it been met with, that the existence of the affection was doubted by Mr. Wardrop. In his most elaborate work on "Fungous Hæmatodes," he absolutely denies the existence of this affection. At page 87, he says,—“I much suspect whether *cancer* ever affects the globe of the eye in its *primary* form; at least, I have never met with an example of this kind.” And again, a little further on,—“I have never been able to obtain an accurate account of a single case, where any of the coats or contents of the eye-ball were the primary seat of *cancer*.” So, likewise, we have no

<sup>a</sup> Dublin Quarterly Journal of Medical Science, August, 1858.

mention made of the affection in Mr. Tyrrell's book. Mr. Lawrence, in a Clinical Lecture, published in the "Medical Gazette," July 2, 1847, gives a brief description of a case, and refers to the specimen in attestation of the subject. I shall briefly give the details in reference to it, and then dwell upon the remarkable facts in relation with my own case. The specimen was removed from a middle-aged man by Mr. Wormald, and deposited in the Museum of Bartholemew's Hospital. It is thus described in the Catalogue of the Museum (Series ix., No. 17):—"The tissues of the anterior and inferior third of the right eye are occupied by an irregular growth of firm and very vascular substance, with a granulated, warty, and very vascular surface. The optic nerve, of which a portion is preserved, is sound. There was no return of disease in the orbit, but the patient died with medullary tumours in the heart and in some other parts, two years after the extirpation of the eye." The condition of the heart is thus described in the Catalogue:—"Part of a heart, in which there is a large mass of firm medullary matter in the substance of the apex of the right ventricle and of the septum. The morbid mass has not altered the external form of the heart; but it projects with a coarsely granular surface into the cavity of the ventricle, and has raised up the tricuspid valve; in its middle, its substance is softened and broken down. The pericardium is in every part closely adherent. The aorta is dilated, and both it and its valves have earthy deposits in them"<sup>a</sup>. The opinion of so eminent and so distinguished a surgeon as Mr. Lawrence upon this specimen should not be omitted, as we would submissively bow to his judgment in many cases; so I shall declare his opinion here. Referring to case No. iv., in his paper, and that which I have transcribed, he writes:—"Cancer of the eye is a rare affection; very few instances have come within my observation. The preparation now before you shows that the disease is less disposed to extend to the surrounding parts than when it occurs in many other situations: the female breast, for example. The anterior segment of the globe is converted into a dense scirrhouss mass, of considerable thickness; while the posterior surface and the optic nerve are unaffected. The palpebræ, with their mucous membrane, the portions of muscles of the globe and optic nerve left in the orbit, were removed after death, and are seen in this preparation, free from disease. Thus, there was no return of disease in the part; but the patient died of secondary cancerous affections, having survived

<sup>a</sup> *Op. cit.*, Series xii., No. 60.

the operation two years. It is worthy of remark that, although the primary affection was *genuine scirrhus*, the deposit in the heart had more of the medullary character."

And now with regard to the case which was operated on, in Mercer's Hospital, by myself.

Eliza Doran, aged 69, admitted to Mercer's Hospital, November 1, 1859. Two years before the above date, she was suddenly seized with racking pain in the eye, which awakened her from sleep. On the following morning, the entire organ seemed red, with a profusion of tears flowing from it, which she ascribed to the severe rubbing and pressure that she made upon it to try and get relief from the burning pain in the ball. This pain remained unabated for days, and gradually the sight became dim; she could, for nearly three months, discern objects, but could not clearly distinguish their characters; gradually even this power of imperfect vision was lost; and in five months after the first occurrence of the pain, "a red fleshy pimple" came upon the cornea, and gradually, slowly, increased up to the time of her admission. Her condition, when submitted to my care, was as follows (see Plate II., Fig. 1):—the tumour was fully as large as the section of a walnut, but considerably more prominent; it projected between the lids, and their conformation imparted to it the oblong shape in the transverse axis. However, on separating the lids, the tumour then presented a more circular shape, and was about the size of a two-shilling piece; the growth at its base was considerably less, and seemed to exceed but in a very little way the imbedding of the cornea in the sclerotic coat; from this comparatively narrow base, then, it sprung, and spread out, overlapping to some extent the sclerotic, and projecting between the lids; the entire surface of the growth was mammilated, and made up of firm, dense, fleshy-coloured structure, which, to the touch, was hard as cartilage, did not bleed on being handled—in other words, of strictly scirrhouss nature, with a thin watery secretion pouring from it and the conjunctival membrane on either side in great abundance. Pressure with the finger did not pain or hurt; the growth could be handled with impunity, though the wearying lancinating pain seldom ceased; and the exasperated hemi-crana, aggravated during night, seldom during these hours was remittent.

Accustomed to meet and deal with such matters, no doubt existed in my mind as to the nature of the case being true scirrhus, set up in the cornea and its conjunctival membrane, and developing itself to the remarkable size mentioned, without involving surrounding parts; for, absolutely, the marginal

Fig. 1.

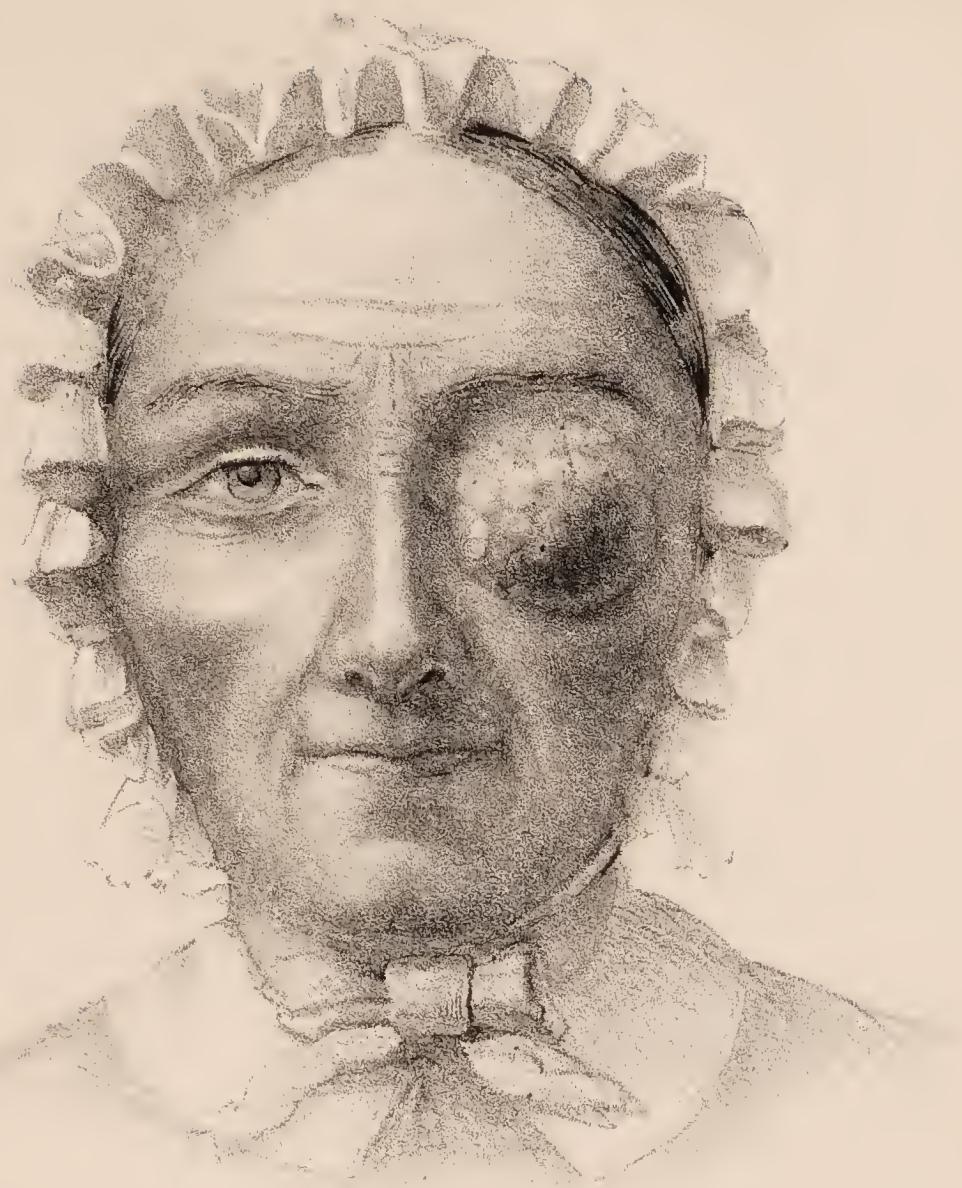
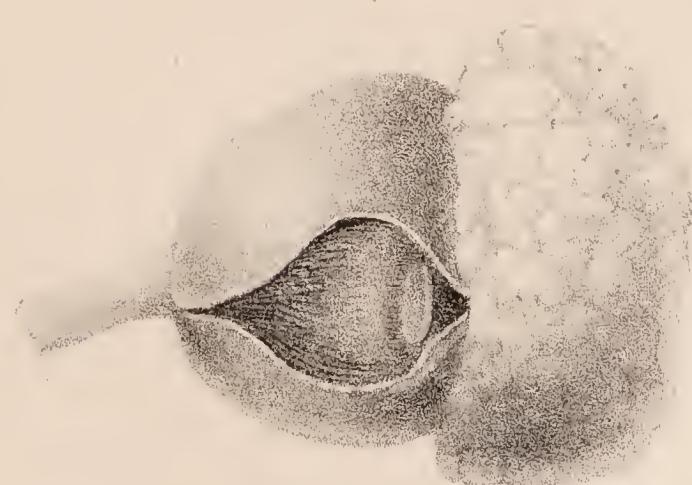


Fig. 2.



McC Butcher in Extirpation of the Eye

Engraver & Sculptr. Dublin



circumference of the cornea to the sclerotic was free from all apparent implication. This was quite clear, demonstrated on lifting upwards, and gently drawing forwards, the morbid product, the lids being restrained apart; all behind this marginal ring seemed exempt from disease. By passing the fingers gently and deeply into the orbit, a certainty of all the contained parts within this bony recess being uncontaminated was conclusively arrived at; the lachrymal gland, buried in its own recess, was free from enlargement, or centered as the nidus of pain. Those darting pains frequently passing through the brow, or those stings, habitual in the tumour, were never transferred to this special and suspicious locality. By the most careful examination I could not detect any other organ implicated in disease, and the woman readily assented to my proposal of removing the part. On the 11th of November, 1859, I proceeded to operate, after the following manner:—the patient was placed recumbent on the operating table, the head being raised by pillows; she was quickly brought under the influence of chloroform; the left eye being the one affected, the head was slightly turned to the left side, so that the blood, issuing from divided vessels, might have a ready drain outwards, and not obstruct careful inspection throughout the after steps of the operation. The head being carefully steadied, the upper and lower lids held apart by approved retractors, a curved needle, armed with a strong silk thread, was passed through the eye-ball, or rather, anterior to that part from whence the malignant growth seemed to spring, thus traversing its base from without inwards, from its temporal to its nasal side, avoiding injury to the parts behind, so as to admit of clearer investigation afterwards as to the parts from which the growth had its origin and sprung; the ends of the thread being knotted, the needle was cut away, and thus a means secured of drawing the eye in any direction that might be required, so as to facilitate and expedite the steps of the operation. This being effected, the upper and lower lids were held apart by the retractors, and an incision carried outwards for three-quarters of an inch, disuniting the lids at their external commissure; the upper lid being elevated, and made tense to the degree required, and the eye steadily drawn forwards, I passed a fine long-bladed knife in a semi-circular sweep from the inner to the outer wall of the orbit, freely dividing the conjunctival membrane, and carefully the levator palpebræ muscle, and the muscles attached to the ball, throughout this trajet; so likewise the knife was swept in the under corresponding range; a gentle touch on the inside liberated the organ, while a more bold and, at the same time,

scooping evolution of the knife, brought down the lachrymal gland entire from its well-marked depression ; the blade of the knife being long, and made in each evolution to move according to the conformation and axis of the orbit, it will be readily understood how efficiently all the external parts were divided and set free ; blood flowed freely throughout these incisions ; but, from the admirable position of the patient, it did not interfere with quickly prosecuting the end aimed at, the perfect extirpation of the organ by section of the attachments of the recti muscles, and division of the optic nerve and its accompanying vessels far back. This was readily achieved by passing the knife along the outer wall of the orbit well back, the eye being gently drawn forwards and inwards, so as to make tense the parts ; by a sudden decided stroke from above downwards, the muscles yielded, and the nerve was severed, and so the parts liberated came readily away ; blood flowed briskly, but was restrained by passing a few strips of lint into the chasm, so as completely to fill it up, and by then laying down the lids, and placing a compress outside all, retained by the gentle pressure of a few turns of a bandage ; the lids were not stitched where separated at the outer commissure, for reasons presently to be noticed ; she quickly recovered from the chloroform, and was conveyed to bed ; shortly after an opiate was given, and sleep procured. It is unnecessary to give the daily reports ; the patient went steadily on to cure.

On the third day after operation, one of the strips of lint was gently withdrawn, and on the fourth the two remaining stripes ; no blood flowed after. The orbit was gently syringed out with tepid water once a day, and a little simple ungent smeared upon the lids, where they came in contact. Steadily the purulent discharge diminished, and ultimately ceased altogether. Sedatives were given to procure rest, and the most liberal diet from the time of the operation to her perfect recovery. She left the hospital on the 5th of December. It was most remarkable the great change brought about in this old creature by so successful an operation ; her nights were undisturbed ; her appetite was restored, and quickly she gained strength, put up flesh, and never ceased to reiterate her prayers and thanks.

Independent of the external characters, so typical of malignancy, and so readily recognised by the practised eye, the most careful microscopic examination of the tumour led to no other evidence, than the true scirrhouus nature of the growth. The characters revealed by the microscope were very analogous to the representation annexed to the case, No. 5, one of the many

figured in an elaborate paper which I published in this journal, "On Encephaloid Cancer, and the Cancerous Degeneration of Warty Excrescences, with the operative treatment applicable to each"<sup>a</sup>. To place the question beyond all doubt, I submitted a part of the tumour, for microscopic examination, to Dr. Mason, the accomplished microscopist, and lecturer on physiology, in the "Original School of Medicine," Peter-street; his account perfectly harmonises with the conclusions arrived at by myself, and in every way confirms the accuracy of the investigation. On prosecuting the dissection with the knife, it was very evident that the entire structures, the whole thickness of the cornea, were matrixed in the abnormal production; and here, again, the microscope substantiated this conclusion. On removing the adherent fat and areolar tissue, and elevating, at the same time protecting carefully, the attached insertions of muscles, all the globe posterior to the encroachment of the morbid growth seemed on the outer surface healthy; the bulk or volume of the part was not augmented; and the sclerotic coat, throughout, presented its normal glistening appearance; the optic nerve was healthy in its section, natural in its form, and unaltered at its external conformation. After the foregoing conclusions were arrived at, from the most careful and repeated examination of the recent parts, then the specimen was plunged into proof spirit, so as to prepare it for an adequate and just examination of the parts within. After five weeks elapsed, it was then carefully examined; and the following conditions testified to the effect of the spirit, so as to render very satisfactory the examination: the globe of the eye, posteriorly, presented its full convexity, and the sclerotic was, as it were, stiffened; a section of it was made with a sharp fine knife, from behind the malignant growth, along its upper surface, and backwards, to within a few lines of the entrance of the optic nerve; its structure was neither thickened nor thinned from its normal state, anteriorly or posteriorly; by separating the edges, a strict and beautiful view of the parts within was afforded; the posterior chamber was not encroached upon in any way; the retina lay as a whitish thin film in plicæ, or folds, in the bottom and towards the lower part of the sides of the chamber, and was natural in every respect, as well as the nerve at its entrance expanding into it. On floating the specimen in spirit, and gently agitating it, the plicæ unfolded, the delicate mesh waved through the fluid, unchanged and unaltered, save by condensation with the spirit. The chamber was not altered in its walls, the ciliary processes

<sup>a</sup> Dublin Quarterly Journal, November, 1856.

were healthy, neither was it encroached upon from before; for the lens lay in its natural position, while the iris was resting against it, but not adherent; and the anterior chamber was obliterated—the cornea, as already mentioned, being not only incorporated, but forced backwards, flattened towards this feeble partition. (See Plate II., Fig. 2.)

On the most careful examination, there was no evidence of contamination beyond the limits already assigned; the strictest microscopical investigation was pursued of every adherent or approximating tissue, the muscular, areolar, &c., the lachrymal gland,—but all seemed exempt from contamination, as might have been with certainty prognosticated from the isolated manifestations of this rare affection.

In Mr. Lawrence's remarks, published in the *Medical Gazette*, as already quoted, the similitude of the rare specimen which he exhibited to the class bears a most remarkable analogy to mine. See how strictly the description harmonises with what I have written. Now, whether the pathological condition of the cornea described was secondary to the involvement of the conjunctival membrane, I know not, as not having seen the case sufficiently early to determine. I am aware that Scarpa lays the seat of the true carcinoma as being the conjunctival membrane<sup>a</sup>; and Travers expresses himself, likewise, as holding the same opinion<sup>b</sup>, and to this effect; so far as present evidence extends, if we except the lachrymal gland, this *membrane* is the only texture connected with the eye, ever primarily affected with carcinoma.

Now, I conceive it necessary to write upon a few points relative to the operation:—1st. On all accounts, it is better to place the patient recumbent, and leaned a little towards the affected side, so that chloroform may be administered to the best advantage, and the safety of the patient; and that the blood may have a ready escape, and not interfere with the after-proceedings of the operation. 2nd. That the lachrymal gland should be taken away, in all instances, when the operation is for cancer, or when an artificial eye is not applicable, so that no undue secretions may be produced, streaming for ever over the cheek, the delicate lachrymal puncta being probably obstructed, spoiled in their functions, by the resenting inflammation set up by injured parts; this objection to its being left being altogether apart from its liability to secondary infection. 3rd. It is of great importance to the humble sufferer that has

<sup>a</sup> Scarpa on Diseases of the Eye, page 526, Second Edition.

<sup>b</sup> Travers' Synopsis of the Diseases of the Eye, page 90.

been compelled to seek safety for life in this shocking operation, that no disgusting traces should remain, by the lids being apart, as so frequently occurs, with a rather prominent red fleshy protrusion from within; or, if not projecting, at least appearing sufficiently repulsive within the space. Again, when all has been scooped out, the lid retracts, and a dark chasm appears below it; or, again, it shrinks deep back, with the under lid, possibly swollen, vascular, and painful, irritated by excitants from without; to the poor the numerous advantages of artificial eyes, even when applicable, are denied from sheer costliness and expense; in many, even the peculiarities of the case forbid their adoption; yet it is an all-important consummation to avert pain and suffering, to remove revolting deformity. Amongst the wealthy, too, sometimes, art purchased by money cannot separate the afflicted sufferers, in their sad lot, from the poor, as when the artificial eye is not applicable; and then each rests upon the same vantage-ground, the hopes and trust for relief from agony.

Now, when the artificial eye cannot be made applicable, be the sufferer rich or poor, it is of the utmost importance that extraneous matters floating about in the atmosphere, and the sharp winds of a changeable climate, should be guarded off from the delicate and sensitive parts within. I therefore suggest for adoption the method of managing the lids pursued in the foregoing case—namely, after separation of them by section at the outer canthus, and after the several steps of the operation to the removal of the organ, not bringing the divided surfaces in contact by adhesive straps or stitches, but permitting the upper lid to slightly overlap the lower, by a little more than the depth of its tarsal cartilage; if, as the wound heals, the drooping should threaten to be too great, then the lid may be slightly elevated, which can be readily effected by gently drawing it outwards, and maintaining it at the required tension, either by strap or stitch. Sometimes the lid, if redundant, will be inclined to fall inwards; this, too, may be prevented by the insertion of a stitch judiciously placed outside, so as to make a little tense the lid, and, at the same time, give it the least possible tendency to eversion of its tarsal edge; when the wound heals, this will not be found too great. By this method I have secured the most perfect immunity from annoyances by extraneous matters; by this mode I have secured the most placid expression of countenance, free, in every respect, from any repulsive or deformed trace.

The foregoing case is, I think, replete with interest, in many particulars, not alone from the extreme rarity of the affec-

tion, true scirrhus, generated, set up in the cornea and its conjunctival membrane, attacking the ball of the eye, an isolated manifestation of malignant disease; but, again, from the pathological conditions revealed by microscopic investigation, by the most careful dissection, bounding its encroachments with the nicest exactness; and, lastly, and above all, the important and consolatory evidence adduced from well-applied and timely interference.

When particular modes of treatment are brought into practice, and insisted upon, extolled, and based firmly on good grounds, it becomes the duty of those engaged in the work to sedulously guard the superstructure—at least, to endeavour to point out carefully what ought to be done in perfecting the work, not only by precept, but example; therefore I make no excuse for again recurring to excision of the elbow-joint; and I care not if I should be considered tedious, if the facts arrived at be at all proportionate to the deep value I set upon their just appreciation—even one truth realised towards the advancement of operative surgery.

The following case of excision of the elbow-joint illustrates many points of great interest, and forms an appropriate sequel to the papers which I had before the honour of publishing on the subject in this Journal<sup>a</sup>:—

**CASE III.—Successful excision of the elbow-joint and adjacent ends of the bones, five inches in all being removed. Great disorganization of the surrounding tissues, yet healthily restored. Recovery, with the motions of the limb nearly perfect.**

M. Reynolds, aged 20, was admitted to Mercer's Hospital, July 16th, 1859, with incurable disease of the left elbow-joint. Ten months before, he got a slight wrench of the joint, the pain and soreness after which disappeared; however, a fortnight had not passed by, when the same annoyance again recurred; he bore with it patiently, and doctored it at home with stupes and herbs; but, matters grew gradually worse, and at the end of the second month he lost all power in the forearm; he could neither flex nor extend it, though retained in a state of partial flexion, with the hand pronated; the swelling gradually increased, the pain became more intense; he had several opinions, and various modes of treatment put in prac-

<sup>a</sup> On Excision of the Elbow and Wrist-Joints, and the Preservative Surgery of the Hand, Dublin Quarterly Journal, 1855; and Reports in Operative Surgery, Dublin Quarterly Journal, February, 1859.

tice for its restoration, but all to no effect; for a time the intolerable suffering would be alleviated, and the high fever subdued; but still each accession and repetition of active inflammation added to its bulk, augmenting the proportions of the limb, even above and below the joint. After the fourth month, abscess formed, and broke by an ulcerated patch above and to the inside of the internal condyle. Others, at a later period, formed and burst on the forepart of the limb. Each suppurative crisis, each evacuated purulent dépôt, for the time, gave relief—that is, of course, by comparison with the exacerbation of symptoms ushering in its formation, and the disintegrating process, set up, perpetuated, and completed for its escape; though the pressing symptoms were ameliorated by results such as these, yet temporary indeed was the looked for consummation; the persistent discharge, the irritable sinuses, the stinking fœtor, all remained as so many sources of irritation, undermining the health, and robbing the body of all strength and vigour. Thus, until the period of his being placed under my care, matters became daily worse, both locally and constitutionally, so that life was pressed hard, closely threatened by death.

His condition, when placed under my care, was as follows:—The limb was enormously enlarged, its measurement around the joint being 17 inches, while a corresponding measurement on the sound limb was only 6 inches. From this enormous bulk, the swelling gradually tapered above and below. For 4 inches the humerus participated in the bulk, and downwards for at least 4 inches the forearm was involved. The coloration of the part was also remarkable; and on superficial or casual inspection, a great likelihood to malignant disease of the encephaloid form was manifest. The redness partook of a deep hue in many parts, relieved by patches of modena tint, while yellowish patches were interspersed freely. The several openings presented everted edges, with fungoid, spongy granulations. To the touch, there was great elasticity throughout, and pitting on some parts. When the pressure was carried deeper, matter was even forced to well up from one of the many sinuous tracks beneath. The examination in this necessary and determined way caused great suffering; and the man guardedly steadied the forearm by grasping tightly in the prone position the clammy, wasted, extended hand, with the sound one. The discharge from the several sinuses was profuse; through these sinuses, so extensive, so tortuous, and burrowing, curved probes were passed for many inches, previous to coming in contact with diseased bone; yet that the joint

was irrevocably broken up in its integrity, hopelessly destroyed in its adaptation, was sufficiently manifest from the unnatural mobility displayed in the slightest manipulation of the part. Antero-posteriorly, and laterally, the disintegration of tissues seemed equally advanced; while, from the grating within, it was clear that the articular surfaces had suffered in a like way. The evidence was confirmed by the probe, and the diseased bones tracked out with much accuracy, almost throughout their entirety. I have alluded to the hand, already so characteristic, as emaciated, sweaty, and extended: however, the patient had some power in making the muscles of the forearm act upon the fingers, and ever so slightly flex and extend them; but no power could be excited in the wrist—support being taken away, the hand drooped. All above the swelling, the upper-third of the arm and shoulder were greatly emaciated, throwing into far bolder relief the immense augmentation of bulk produced by infiltration of tissues, and new deposits, all around and about the diseased articulation. Many would suppose, after inspection of the limb—aye, and even after the careful examination of it too, that amputation was more applicable to the case than excision. So emaciated and worn had the young man become, from long suffering, that he came up to town, from the country, to be relieved from his disease. It was quite clear that his constitution could not battle on much longer; already the fatal effects of the unrelenting irritation were becoming more and more manifest. His appetite was gone for months; he was perpetually bathed in sweat, his hair falling out, his pulse double its normal frequency; repeated attacks of diarrhoea, and at times loathing, vomiting, and rejection of all food. Here, then, we have the constitutional manifestation of the local disease sapping the very life. I repeat, many would have supposed the case suitable alone for amputation. However, I did not think so, from experience in serious cases of the kind, and observing the preponderating disorganization and changes as exhibited in the soft parts, consequent upon diseased bones. I am of opinion still, as forcibly expressed in former papers bearing upon the question of excision of joints, that much weight need not be attached to this change in the superficial structures shielding-in the joint; and, as I have before written, this precept may be adduced, *Remove the sources of irritation, the dead bones, and in due time the soft parts will recover themselves.*

I decided, then, on excision in this case, having assured myself that the bones were not corrupted beyond a certain extent, and being practically cognizant of facts which could

not but bear encouragement and confidence to the true interpreter of nature's efforts in the power of compensative adaptation for parts dwindle, decayed, or lost; and thus I rested upon the hope of saving the limb. Again, the power, though a limited one, of flexion and extension of the fingers, was in abeyance; the youth of the sufferer buoyed up the hope of conservation; and, I may be pardoned for saying, the successes of dark and cheerless cases made me cling to this doctrine so forcibly inculcated in the best schools, and which I have myself so warmly espoused, and endeavoured to lift up by my feeble voice and pen, at the same time with a determined vigilance and integrity to be just, for the cause of science, and, above all, in its highest appliance, the benefit of humanity. Having decided upon operation, no time was to be lost; and, on the 22nd July, I excised the diseased bones after the following manner:—

The man being placed lying down upon the operating-table, he was steadily and quickly brought under the influence of chloroform. The affected arm was grasped by one assistant above, and thus the main artery of the limb controlled, and the shoulder steadied. The entire member was rolled inwards, so as to expose its posterior surface, and the forearm and hand steadied by a second assistant. Standing, then, on the left side of the patient, with the left hand fixing the affected joint, I plunged a strong-pointed knife into the soft parts several inches above the articulation, immediately over the posterior aspect of the limb, making a vertical incision, full six to seven inches in length, through the entire depth of the disorganized tissues, down to the bones. Blood did not flow quickly from this extensive wound; and so deep was it, that my index-finger was concealed when exploring the changes wrought within. I could feel the roughened bones freely enough now; but it was apparent that the long single incision would by no means be sufficient, or render practicable the further steps of the operation; so that the knife was carried from the vertical incision, outwards, for at least two inches, and corresponding to the line of flexion, or rather a little above the head of the radius; but, owing to the inordinate thickening of the parts, sufficient room was not yet afforded for dealing with the bones. Therefore the transverse incision was continued from the vertical, inwards, for about three inches. When the knife was first laid on, it was thrust down to the bones; but, as it was drawn inwards, a lighter hand directed it, so that the nerve should not be imperilled. The mesial and deep part of the commencement of the wound then exposed the bones, while the internal

and more superficial division permitted the more ready retraction of the flaps. The disorganized attachment of the triceps was then cut through, flexion of the forearm forced, the shreds of lateral ligaments and supporting tissues of the walls of the joints freely revealed. The end of the humerus was robbed of its cartilage, and adjacent cancellated layers, while the internal condyle and articulating trochlea for the ulna were not only deprived of cartilage, but absolutely separated from the shaft and remnant of the external condyle. The olecranon of the ulna was deeply eaten out in its sigmoid cavity, and its posterior extremity removed; its coronoid process separated and loosened. The head of the radius suffered in a similar way; while, leading from the deranged disintegrated surfaces, the shafts were mortified largely, to the removal of periosteum, and destruction of the corresponding superficial surfaces of the bones. With difficulty they were released from the matted and unnatural soft parts in which they were so deeply imbedded; this can scarcely be estimated, except by one accustomed to deal with such matters. As the knife freed the parts, being carried steadily and closely round the bones, much assistance was rendered by the occasional introduction of the thumb, index, and middle fingers, so as to surround the end of the bone attacked, and force away by pressure the soft parts from it. A small piece of linen carried in before the ends of the fingers not only assisted the manipulation by steadyng the grip, but also protected them from being wounded by the sharp and detached spiculæ alluded to; each—the humerus, the ulna, and the radius—being separately dealt with, and successively, in this way, as far as the adherent periosteum and maintaining soft parts, marking out and isolating the diseased from the sound bone, as it were; at this junction the saw was applied—that saw which bears my name, and which is now so universally adopted.

The saw, I say, was employed, after the manner which I have so strongly insisted upon in similar cases; the bones being cut from before, backwards. First, section being made of the humerus, three inches and a half being taken away—the bone, when cut, presented the most healthy state,—in a like way the radius and ulna were divided—that is, from before, backwards. Ample and free exposition of their ends having been accomplished, the head and neck of the radius were removed, and the olecranon process, with the coronoid, and an inch of the shaft of the ulna. This section included all that portion of the radius above its tubercle, and the ulna at the same line. It was most pleasing to inspect their cut ends: they

were hard, healthy, natural; while the insertion of the biceps was left undisturbed—a point upon which too much practical importance cannot be placed, as preserving a salutary influence on the after-motions and perfection of the limb. Large masses of disorganized soft parts were then cleft away; but one vessel required a ligature. The limb was then placed in the box which I use for such purposes, and which will be found figured in the February Number of this Journal for 1859. The sides being let down, the limb rested evenly on its inner and ulnar surfaces. The flaps were first lifted lightly towards approximation, and retained in this state by shreds of lint dipped in cold water. The sides of the apparatus were then elevated, and the limb steadied by the protecting pads placed within. The straps were then buckled, and thus all secured.

The patient was then conveyed to bed, having quickly rallied from the effects of the chloroform; and so admirably did it act, that he was not in the least conscious of pain, and had no remembrance of suffering. When he awoke, he could scarcely be brought to believe that an operation had been performed. After being placed in bed, he got a warm draught of wine, and shortly after an opiate, to induce sleep, as he seemed more than naturally excited: evidently a state induced by a double cause, —exalted happiness, by the rescue from apprehended suffering, and the stimulant effects from the protracted inhalation of the anæsthetic. In four hours after the operation, intermediary hemorrhage set in, immediately after an attack of vomiting, so frequent a sequel after the full exhibition of chloroform. The bleeding was slow and steady at first, and by gentle pressure on the humeral artery, high up, was controlled by the resident pupil for a short time. However, whether through inefficiency, or from the blood finding a ready circuitous course on the exaltation of the heart's action, the flow came on more quickly, rapidly, and persistent, so as to create alarm. A tourniquet had then been applied, and I was sent for. It was clear that a considerable amount of blood had been lost; the bed, pads, and sheeting, bore ample marks to this effect. Several large coagula were around the wounded part. I quickly let down the sides of the box, liberated the tourniquet, and cast it off; cleared away the lint from the cut surfaces; turned out all coagula from the deep parts and fissures; let a stream of cold water trickle over all: no vessel of magnitude yielded the supply. Though warm wine was administered, and warm sponges thrust into the deep fissures, yet still the blood welled up rather profusely from several vessels—separately, with but a small stream, and of little consequence—taken

in the aggregate of moment and of great importance, essentially demanding to be checked. Having torn up several long shreds of lint, and steeped them in a saturated solution of perchloride of iron, each was passed carefully into the deepest recesses of the extensively wounded part, and so on a succession of them, until the entire was filled up. Suitable compresses were placed over these, and the limb was bandaged from the fingers upwards, with a gentle, steady support; and as the bandage arrived towards the elbow-joint, it was carried with the same moderate tightness over the compresses, so as amply to supply the place of the fingers which retained them in their position. The arm, in like manner, was lightly rolled from above, downwards; and so, due support offered in this direction, down to where the compresses lay supported by the bandage first applied. The limb adjusted in this way was again steadied in the box, its sides elevated, and the same steady position maintained. The tendency to bleeding was checked, and no appearance of blood issued from the dressings. Wine was now given abundantly, as the man was prostrated to the lowest degree. Full opiates were given every third hour, ice in the mouth to cool the tongue.

6 p.m. No return of the bleeding, but sickness of stomach very troublesome. Ordered two drops of prussic acid to each draught, and iced wine in two-ounce doses every third hour.

23rd. No return of bleeding; and though the stomach was sometimes rebellious, small quantities of fluids and ice were taken with relish. Sleep at intervals. On the whole, he is as well as possibly could be expected. Though a good deal prostrated, yet the pulse is steady, soft, and equable in its beat. The limb is at rest; no pain from it. To continue the wine iced, and draughts of opium; to have some strong chicken-broth, in small quantities, occasionally. Evening report most favourable. Stomach retains all nutriment; and he has slept quietly at short intervals throughout the day.

24th. Has had no returns of the vomiting, slept quietly, and feels refreshed. Took some toast with tea. Owing to the extreme heat of the weather, I was compelled to remove some of the dressings, pads, &c.; this was done with the least possible disturbance or shaking of the limb; the entire was sustained by several hands, so that no drooping at the site of the excision was permitted to take place. The box was then withdrawn, cleansed, and quickly replaced; caution was taken not to disturb the portions of lint thrust deep into the wounds, but all exterior to these were clipped away, and replaced by fresh portions steeped in spirit lotion. After this, I had the

man gently elevated, in the recumbent position, and placed in a fresh bed. Quickly after he exhibited all the benefits of this change, by falling into a quiet, tranquil sleep, that continued for several hours.

26th. Improved, in a most marked way, in all respects. His countenance has lost its haggard, wretched expression. He sleeps, and takes his food regularly and well. On this morning removed all the dressings from within the wound; the suppuration healthily established helped to loosen and cast them off, while a constant stream of tepid water completed their separation without the least pulling or violence, a point to be laid the greatest stress upon, as a repetition of the bleeding, at this stage of the case, might easily compromise the favourable issue. On the 28th, commenced to give gentle support, and draw up the flaps towards each other with adhesive straps and bandages, all the time cautiously guarding against either shaking of the limb or changing it from its flexed position. Every alternate day this treatment was adopted, and so likewise changing the patient's bed linen, &c., &c. Quinia mixture, with small quantities of acid, administered to check some tendency to sweating. Opiates now only given at night. Strong broth, eggs, wine, chop, porter, for nutriment. Under this management, the case progressed most favourably, up to August 8th, when his state is reported in these words:—His emaciation is already greatly removed; he sleeps quietly through the night, without disturbance, and sweating has ceased; his appetite has much improved, and he enjoys his food; his whole countenance has undergone a marked change; he looks intelligent, cheerful, and happy, and speaks with a certainty of soon being well; his pulse is full, steady, and in number 70; the bowels and kidneys perform their functions healthily; and altogether, the constitutional manifestation of relief and comfort is an excellent harbinger of recovery. On this date, the condition of the limb evidences a marvellous improvement, gradual and steady up to the present time—the precursor of that favourable state just described, and stamped on the countenance of the man. The diminution of the bulk of the limb is almost wonderful; in fact, it is one of those changes that must be seen to be believed. The engorged, swollen, puffed-out, unnatural-looking soft parts have altogether put on a new aspect; the sinuses are nearly all obliterated, but little matter weeps from them; the skin, as it were, has regained its elasticity, and disgorged, forced out, the discoloured serum from its tissues; all the deep incisions are consolidated and bound together within; no matter wells up on

compression of the parts; the more superficial portions of the extensive wounds are healed by growth of surface into surface, and the new skin is rapidly creeping in from the margins around, and covering the healthy granulating parts; no more matter is secreted than that sufficient for the protection and well-being of the process of cicatrization; no pain is complained of during the dressing of the part; and the same gentleness, steadiness, and support is as gradually afforded as in all the earlier management of the case; the forearm is kept steady, at a right angle with the arm, due care being taken that the adhesive straps and bandages shall insure their relationship, as well as bind the bones closely together, and thus limit the extent of uniting medium; the box sedulously enforces and guards these several requirements.

August 19th. Up, and walking in the garden. Limb doing well.

December 17th. All nearly healed, and full power in bending the fingers and wrist. The power of flexing forearm, of course, not yet regained.

February 1st. He went to the country, with the limb quite healed, and general health restored.

March 2nd. Had a most favourable account from him. All the motions of the arm steadily returning. He is able to grasp and lift weights with it, and make it useful in all its under motions, while, in a limited way, he is regaining the upward movements. I have beside me this moment a letter which I only received a few days ago from him, and in which he describes his condition as that of perfect recovery; all the motions of the limb being conducted with a steadiness and precision but little different from the sound arm; it is not yet so strong as the right one, but sufficiently so for all ordinary purposes. The conducting of this case to so happy an issue, I look upon as a great triumph to Conservative Surgery. Certainly everything seemed dark and gloomy about it, so closely was he run down, when he came under my charge—the preservation of life, even by dismemberment by amputation, being a proposition that might stagger the most sanguine of success.

I shall conclude this paper by detailing a case in which I excised the entire radius from one articular surface to the other.

**CASE IV.—*Excision of the radius from one articular surface to the other; recovery, with almost perfect motions and functions of the limb preserved.***

Joseph Falkner, aged 17 years, admitted to Mercer's Hospital, January 1, 1859. Three weeks before this date, the boy met with the following accident, produced in a very unusual way:—he was rapidly running down stairs, in the dusk of the evening, his right hand resting upon the bannister as he slid along; suddenly his right heel was checked by one of the stairs, and he would have been precipitated to the bottom, but for the power with which he grasped the bannister; and so he swung violently round, with so much force as to strike his legs against the rails, and his arm, too; he suddenly let go his grip, and fell down, suffering the most severe pain in the wrist. His mother stupefied him, &c., and managed him after her own way, the boy at the same time being very unruly, and incapable of being restrained from going to play with his companions; latterly matters assumed a more serious form: the limb became more painful, red, and swollen, and the boy finally could not obtain any sleep. Thus he was brought to hospital, haggard, thinned, worn out from want of rest and inability to take nourishment; the hand was swollen; the forearm red and discoloured, and enlarged by œdema and engorgement, highly sensitive to the slightest touch. On examining the limb, I readily detected the solution of continuity; the epiphysis was wrenched off from the lower end of the shaft of the radius, while the bone was again smashed high up below its tubercle, and the insertion of the biceps; thus the solid bone suffered, while conjointly there was such laceration of soft parts, stretching and tearing of ligaments, that inflammation had run its course, and extensive abscesses passed up the entire length of the forearm, on the posterior surface, and even between the bones. The patient was so wretched, stricken by starvation and loss of sleep, that I confined him to bed, communicated soothing heat, coaxed him by palatable food to eat, compelled sleep to settle on him, by narcotics, for some hours. I then cut freely down upon the matter, and allowed it to escape, slit the tightened fascia so as to relieve constriction and congestion. I next bandaged the limb from above downwards, and from below upwards, leaving the wound free for escape of all secreted and exuded fluids. The fore-arm and hand were then steadied upon a splint, so as to secure against the least disturbance of the disrupted parts: most liberal diet, quinia.

January 8th.—The lower part of the limb is much im-

proved; constitutional disturbance subdued. He sleeps the entire night, and eats well; another abscess forming higher upon the back of the limb, close to the olecranon process; this is on the seat of fracture; this likewise had to be opened, so as to guard against thumbing, pressing, and squeezing the matter towards the lower opening; the entire limb was then carefully bandaged, and steadied upon the splint.

11th. There is a connection established between the upper abscess and the cyst of the lower, so that the discharge of the two nearly all flows off by the most dependent or lowest aperture.

13th. Had to make an opening on the forepart of the limb, about its centre, owing to matter burrowing in this direction; supported the entire by pads, bandages, and splints; wine, Dover's powder, bark, beef-tea, and wine, freely.

19th. Pressure carefully made each alternate day from above down, and from below upwards, with bandages, the entire steadied on the splint. Thus matters went on gradually mending, up to March 10th, when I had freely to lay open the parts over the external condyle, and give exit to matter, after gentle support; wine, quina, &c.

On March 17th, the limb assumed a more serious aspect, marked indications of increased bulk and swelling, great pain, and the supervention of a brisk attack of erysipelas; this again was assuaged, cured by suitable treatment.

On the 23rd, had to open another extensive abscess above the internal condyle.

On the 30th, dismissed to attend as an extern, so diminished was the discharge, in the aggregate, from all quarters; many of the abscesses were entirely healed; and, though I had my misgivings about the condition, the integrity of the bone, yet no sufferings created alarm; on the contrary, his general condition was visibly mended, and his strength materially built up. He was removed by his friends at this time to the country. However, on the 2nd of December he was re-admitted, with profuse discharge from the limb, streaming from several openings, characteristic of the presence of diseased bone. On examination with the probe, I detected the radius at its lower part denuded, rough, and gritty; while, again, on its central part it was stripped of its periosteum, hard, and resonant. Higher up again, close to its tubercle, it seemed deprived of vitality; a good deal of dense thickened material was thrown into the soft parts around, and so filled the inter-osseous space, as to remove altogether the symmetry of the forearm. Again, this compensating material, this lymph effusion, was laid down in far

greater proportion on the posterior aspect of the limb. When he was brought back to hospital, it was stated, that, after being at home for some time, and the limb nearly recovered, he was thrown from a car, and the delicate arm again severely bruised and crushed; and though kept quiet, and the part constantly stupefied, the swelling continued to increase, and soon broke, a quantity of matter being discharged by an opening close to the wrist, and in the site of that which had previously existed there, but until then had remained healed from the time of his leaving hospital. A second opening quickly followed in the centre of the bone; and the original one, high up, never healed, and now discharged more freely than ever. On careful examination, it was quite clear that the radius had perished throughout its entire extent, with the exception of its articular surfaces and neck; and I determined on at once excising the bone, to relieve the constitutional symptoms, so seriously prostrating the child, and threatening life.

On the 3rd of December, the boy was brought into the operating theatre, placed lying down, and brought under the influence of chloroform. I selected the posterior surface of the limb as the direction in which the incision should be made for the extraction of the dead bone. A long incision was carried upon the posterior surface of the thickened covering of the two lower thirds of the radius. The edges of the soft parts being drawn aside with copper spatulæ, and also to a slight extent detached or lifted away, a strong scalpel was thrust through the more dense material, and completed throughout this trajet, perfected section down to the diseased bone. With some additional force, this elastic consolidated material was made to recede, so as to allow a more accurate examination. The radius lay in front of this reparative material, it was ascertained as before detected, separated from its epiphysis below, it was rigidly, however, incased all along, and perfectly immovable above. I then made a second incision over the neck and tubercle of the bone, about two inches in extent; and after meeting with some resistance from the same characterized material as already alluded to, I introduced the blades of a long fine bone-forceps, and clipped across the radius below its tubercle. Having done so effectively, I next, with a very strong forceps, grasped the shaft of the bone, and, after some twisting and forcible traction, extracted the entire radius through the extensive wound below. This was most satisfactory, as there remained after, a smooth hollow recess only, corresponding to the posterior three-fourths of the bone. No new material protected it in front; and in the lower part or third of

the arm, the pulsation of the radial artery was quick, distinctly felt from behind. The only protecting barrier seemed to be a slight thickening or condensation of the intervening tissues in the normal relationship between the vessel and the bone. The exterior incision below was not unattended with hemorrhage; on the contrary, it was sharp and rapid—two considerable vessels had to be ligatured. By the shorter incision above promoting easy section of the bone, without subjecting the part to additional violence, or the system to loss of blood, I conceive, a practical fact is arrived at—a good lesson is taught. A few small vessels required to be ligatured, and then the vacant bed left by the extraction of the radius was filled by a few long shreds of lint, soaked in oil, a bandage applied, the limb steadied on a splint, and the boy removed to bed. After a few days, the lint was removed; quickly granulations made their appearance, of a granular, healthy character; soon the hollow was filled up, quickly the edges of the long wound were approximated, drawn together, united; and, in about three weeks after the operation, the limb was healed throughout. It was solid, firm; and, at the end of six weeks, he was able to close the fingers perfectly, and to extend them, to flex the arm and extend it as well as ever, pronation and supination of the forearm being quite deficient. The new material seemed matched to the ulna; but it was a sufficient bond between the lower and upper ends of the bone—a sufficient sustentation for all the required movements, either delicate and refined, or coarse and violent, save two, pronation and supination,—easily compensated for, however, by neighbouring joints.

The whole case, in its management from beginning to end, teaches a valuable lesson: how youth will repair accidents of the gravest nature, by the vitality of its tissues; how that, even with the severest complications, results may be expected that never could be anticipated in later years; how that when, through additional injury, from accidental circumstances, all nature's efforts at repair may be broken up and destroyed, and absolutely a large portion of the solid part of the limb perish by death, yet how that, in youth, this deadened bone, fatal to life, if permitted to remain, may, by a bold and dexterous operation, be removed; and how it may be replaced by a substitute; and how the limb may be restored to nearly the full performance of all its functions,—*by Conservative Surgery<sup>a</sup>.*

<sup>a</sup> The casts taken before and after operation in these several cases, as well as the diseased parts and bones cut out, are carefully preserved in my Museum.

F. Rockwood  
W. Rockwood  
C. Rockwood  
L. Rockwood





Fig. 1.



Fig. 2



M<sup>r</sup>. Butcher on a new operation for the Cicatrical tissue after Burns.